

What is a High Electric Demand Day?



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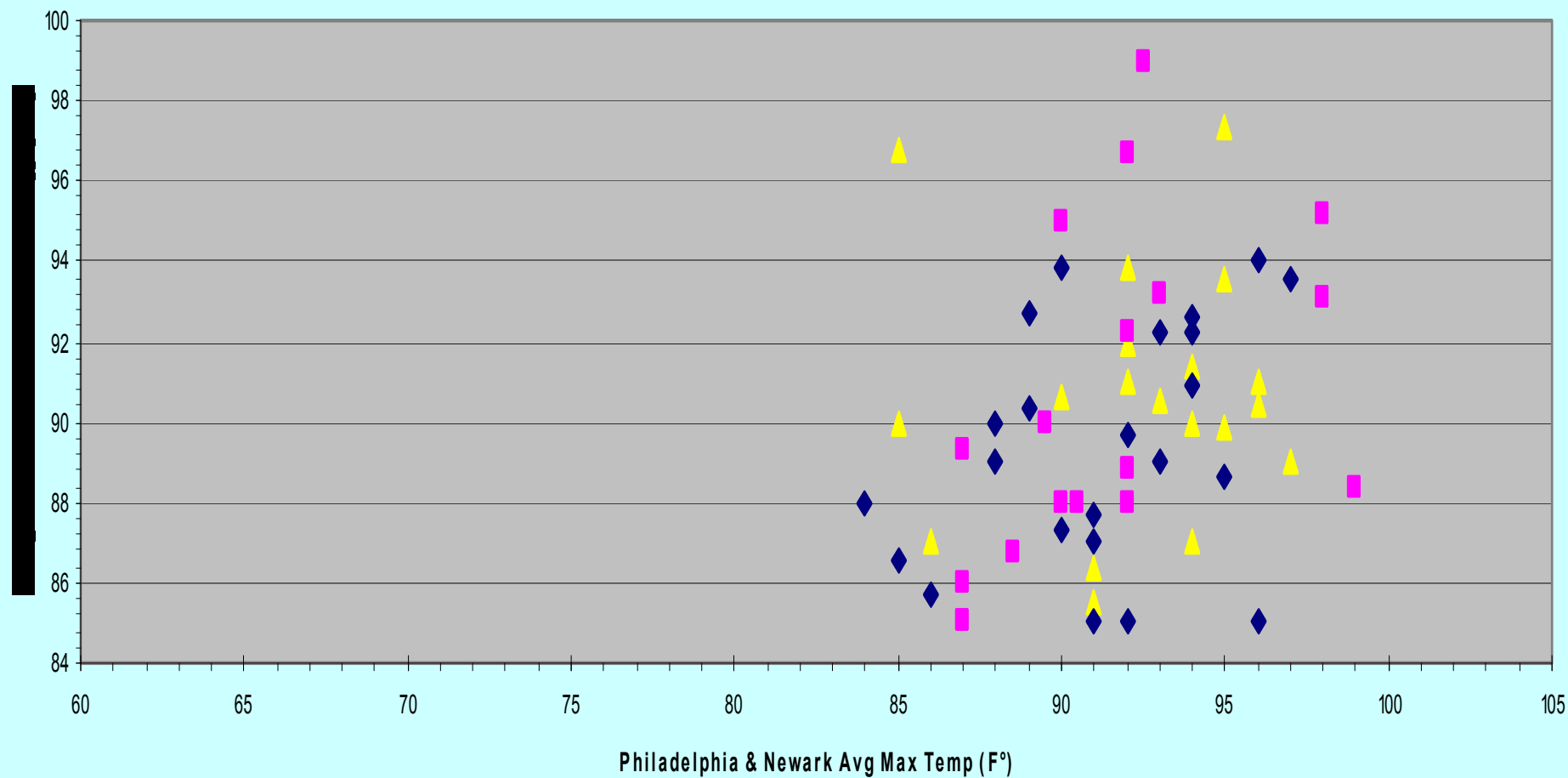
Bureau of Air Quality Planning

July 17, 2008

What is a High Electric Demand Day (HEDD)?

- Temperatures are Elevated
- Demand for Electricity is Elevated
 - Cooling Demand!
- Number of Electric Generating Units (EGUs) in use is Elevated
- NO_x Emissions are Elevated
- Ozone Concentrations tend to be Elevated

NJ Average 8-hr Ozone Exceedance Concentrations on Violation Days with Average Max Temperatures



▲ 2005

■ 2006

◆ 2007

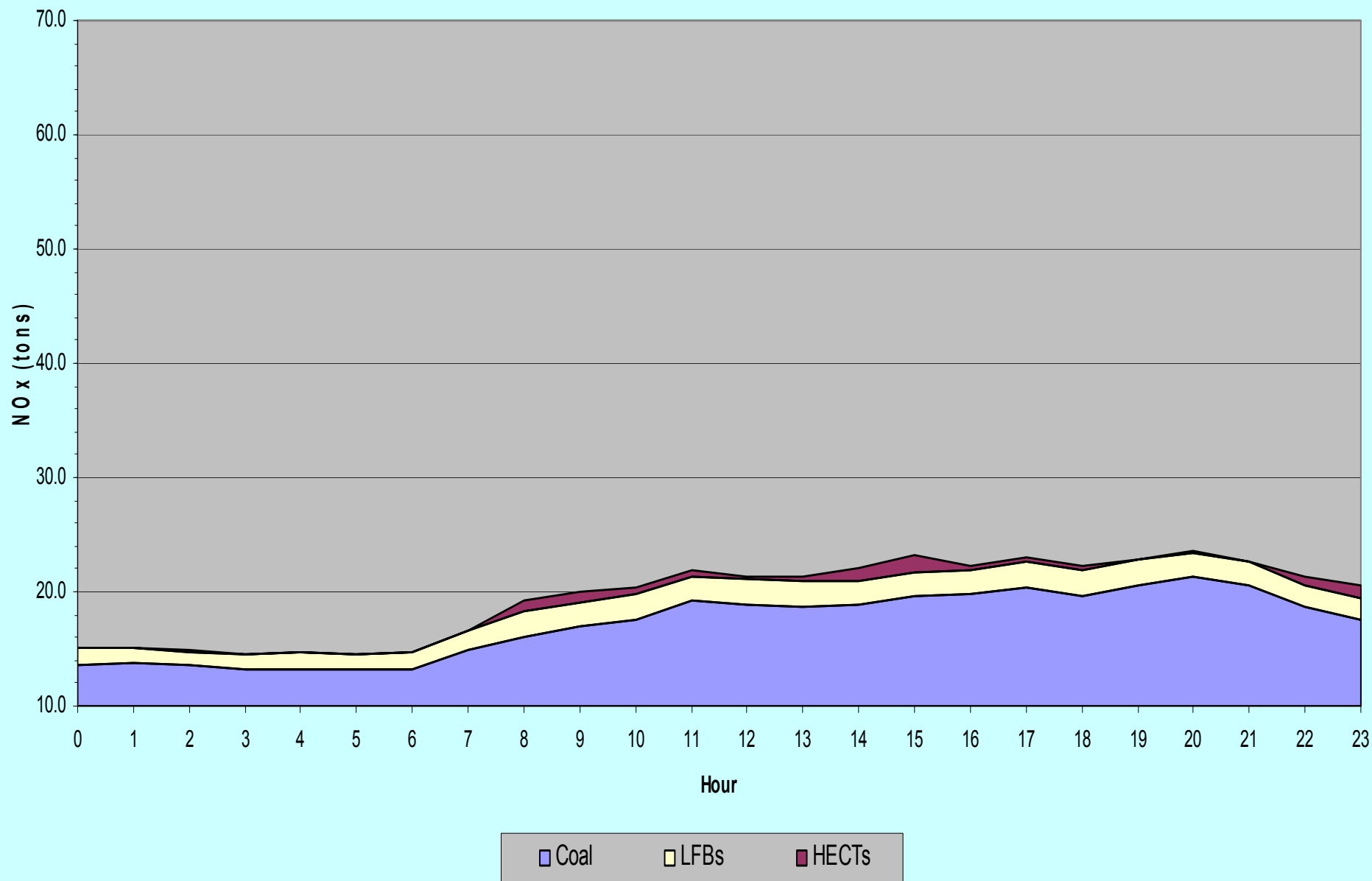
What is an HEDD Unit?

- Operates < 50% of Available Time
- >0.15 lbs NO_x / mmBTU
 - High-Emitting Combustion Turbines (HECTs)
 - Use Factor <1.0% to ~10%
 - Natural Gas, Diesel, or either
 - Load-Following Boilers (LFBs)
 - Use Factor <50%
 - Residual Oil
 - Coal

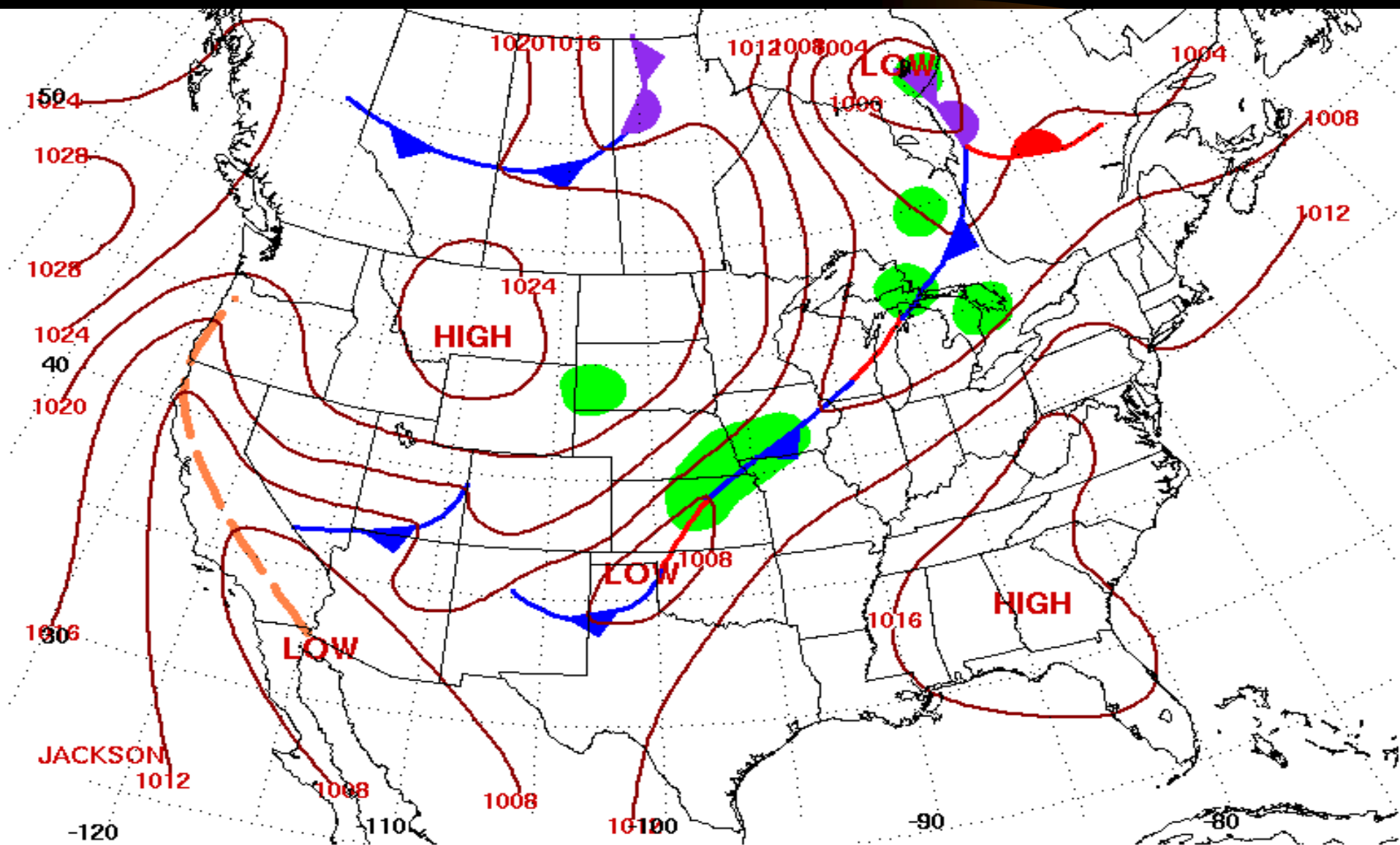
HEDD: Surge in Demand and Emissions

- Average Day in June (6/4/05)
 - Max Temps at Washington, Pittsburgh, Buffalo, Philadelphia ~ Average (73°-77°)
 - NY Area a bit above Average: Newark, Albany, Hartford, Central Park (79°-86°)
- Heat Wave in July (7/26/05)
 - Washington, Philadelphia, LaGuardia = 97°
 - Newark = 99°, Albany = 91°
 - Buffalo – The Cool Spot @ 89°

Maryland to Connecticut EGU NOx Emissions, 6/4/05

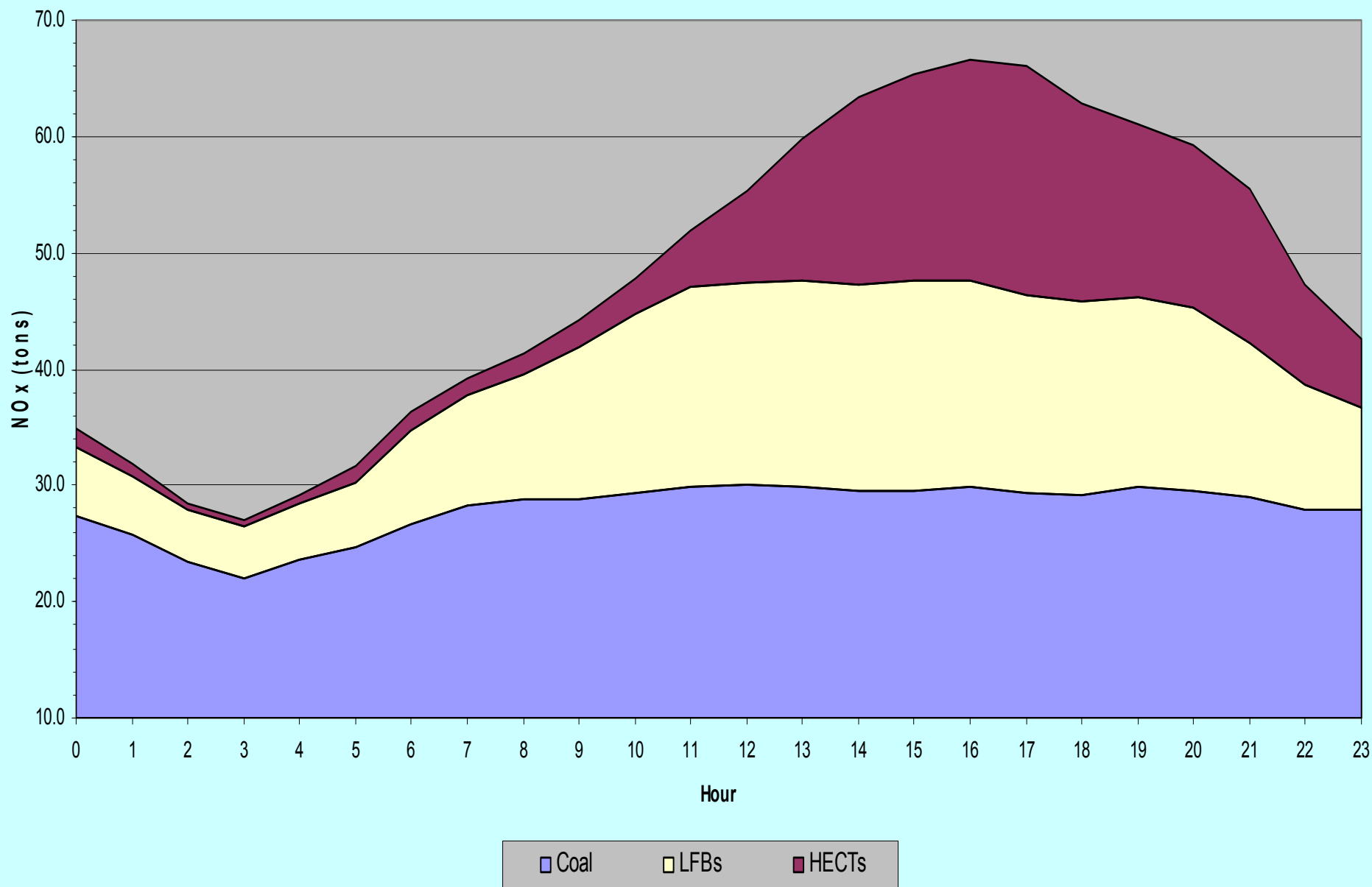


July 26, 2005

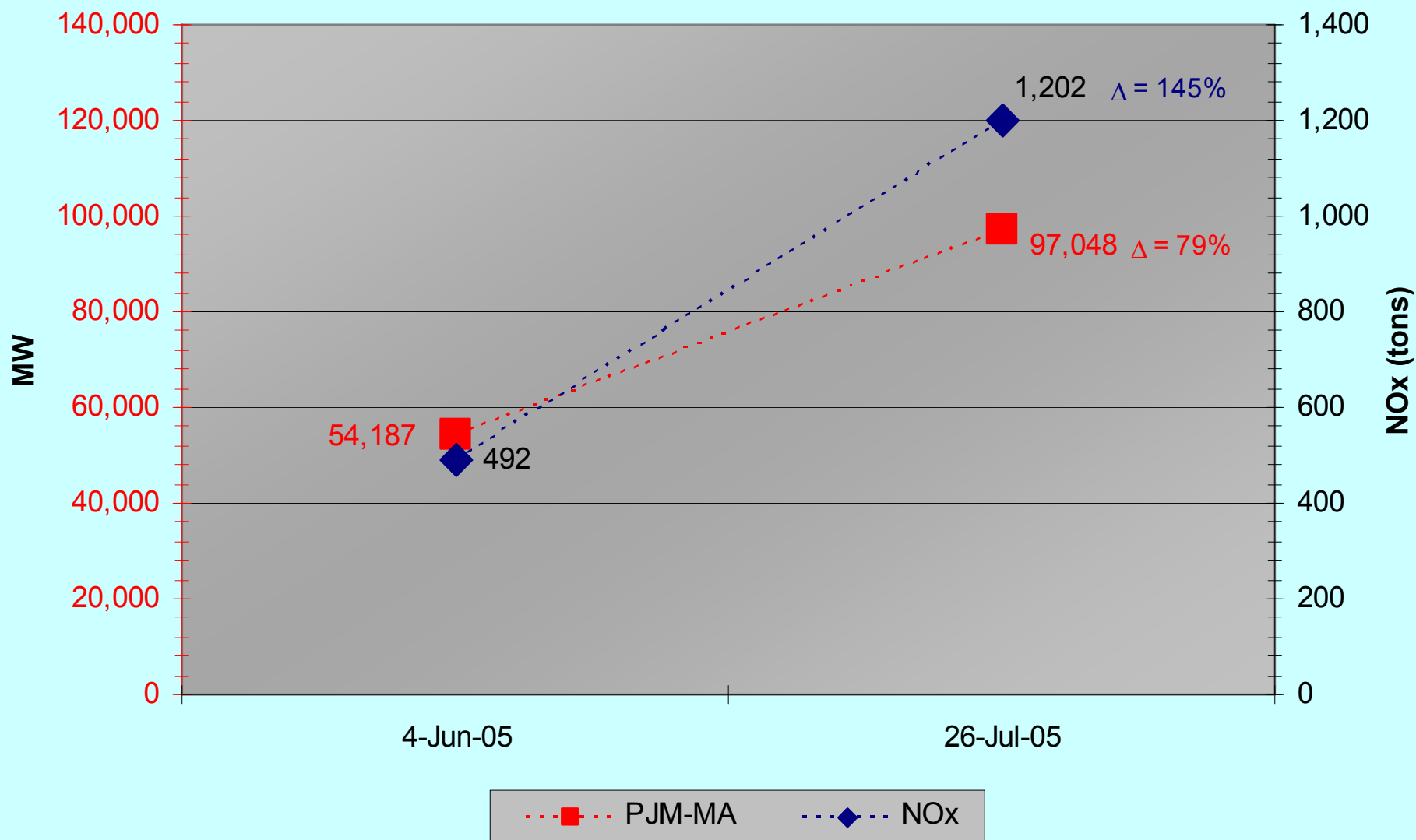


Surface Weather Map at 7:00 A.M. E.S.T.

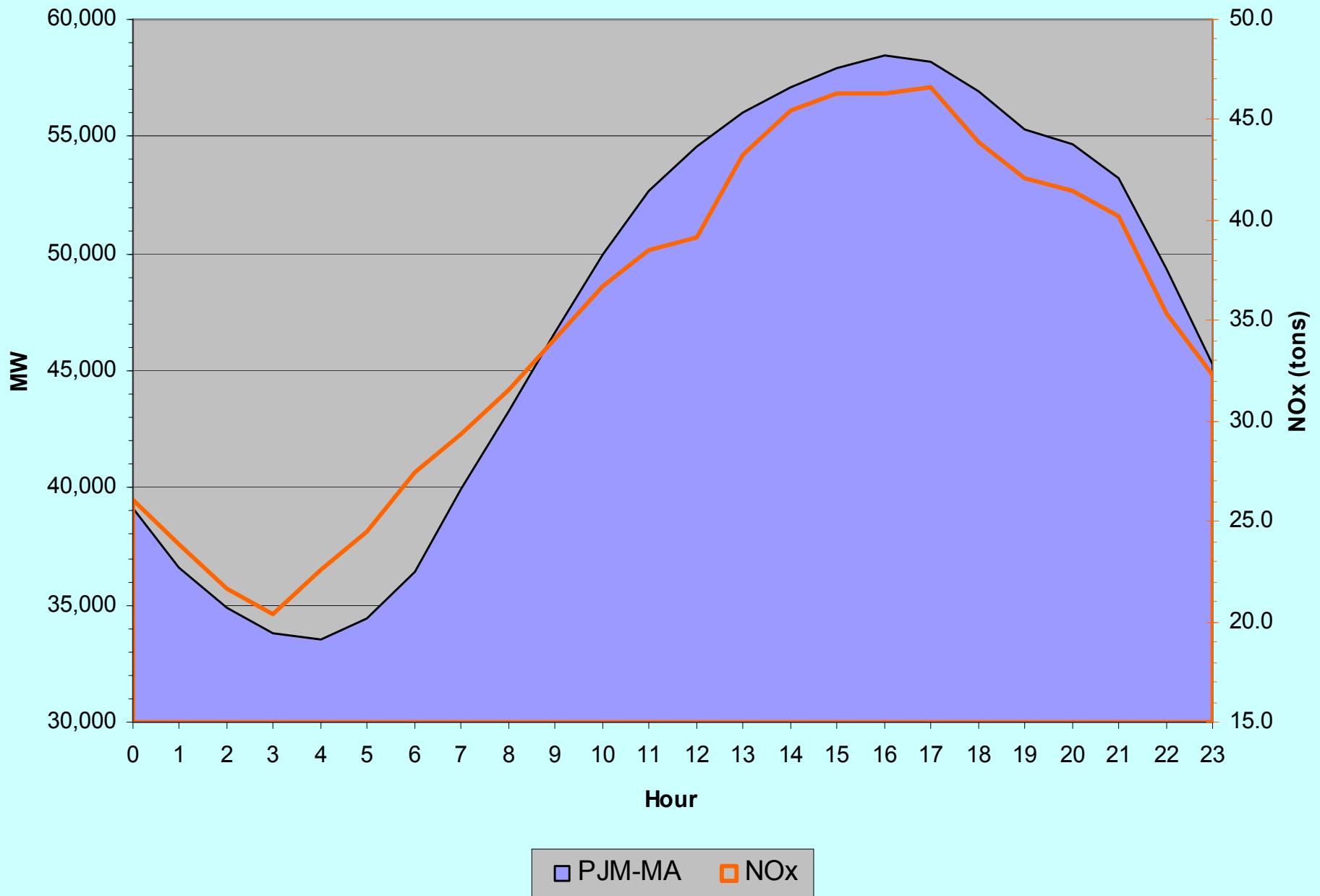
Maryland to Connecticut EGU NOx Emissions, 7/26/05



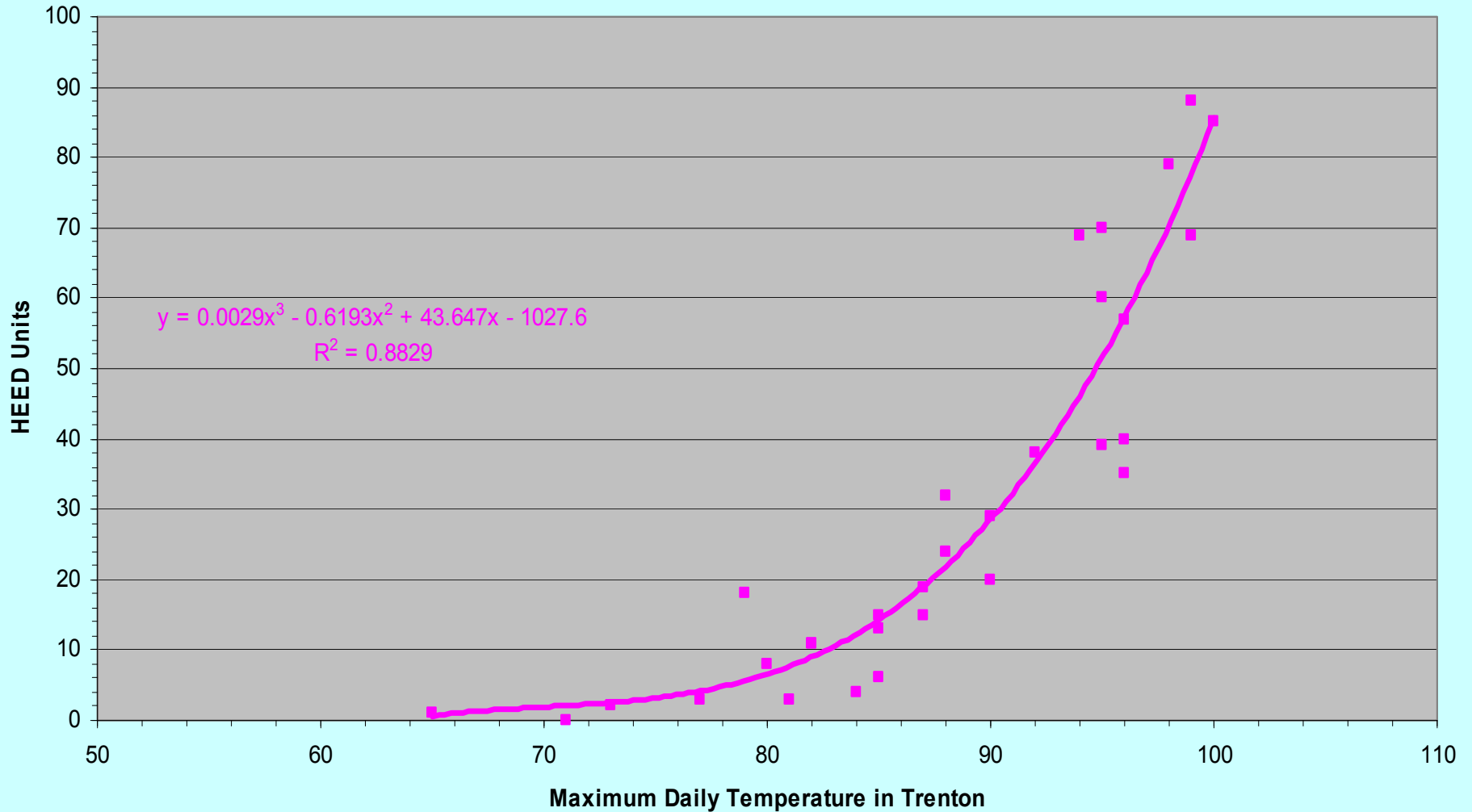
Peak Hourly Power Generation in the PJM Mid-Atlantic Region, NYISO, and Connecticut, with Total Daily EGU NOx Emissions from Maryland to Connecticut



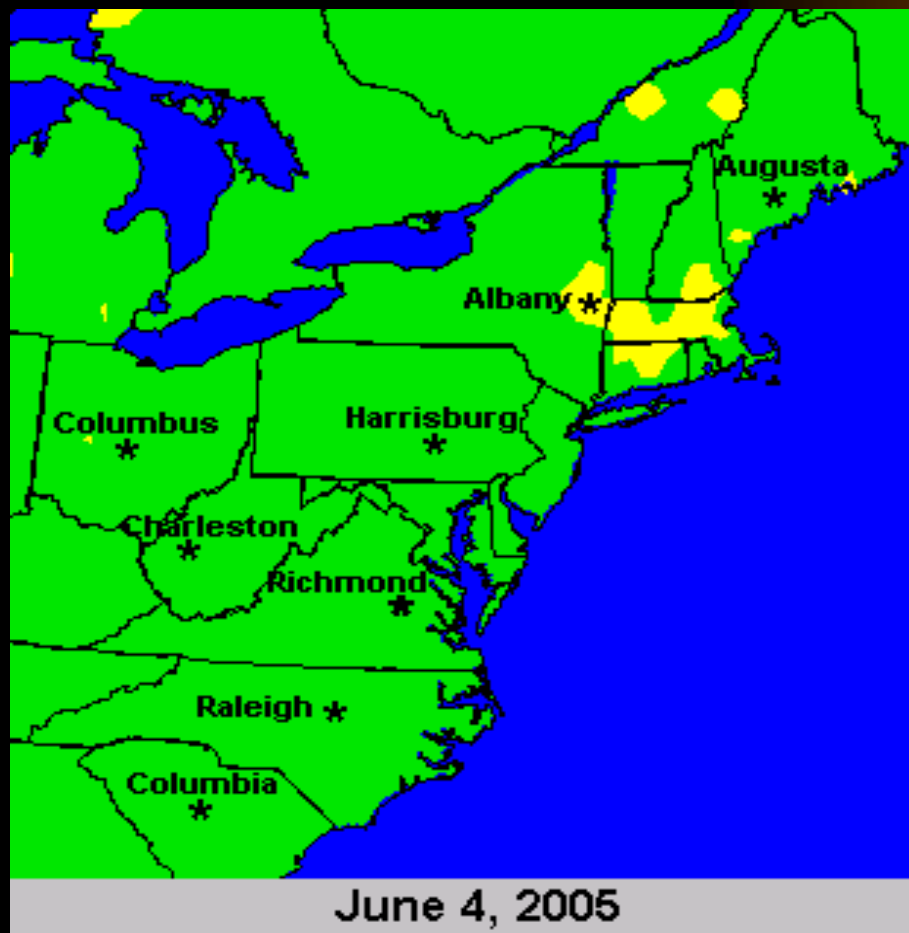
July 26, 2005: PJM Mid-Atlantic Sector Load with EGU NOx Emissions



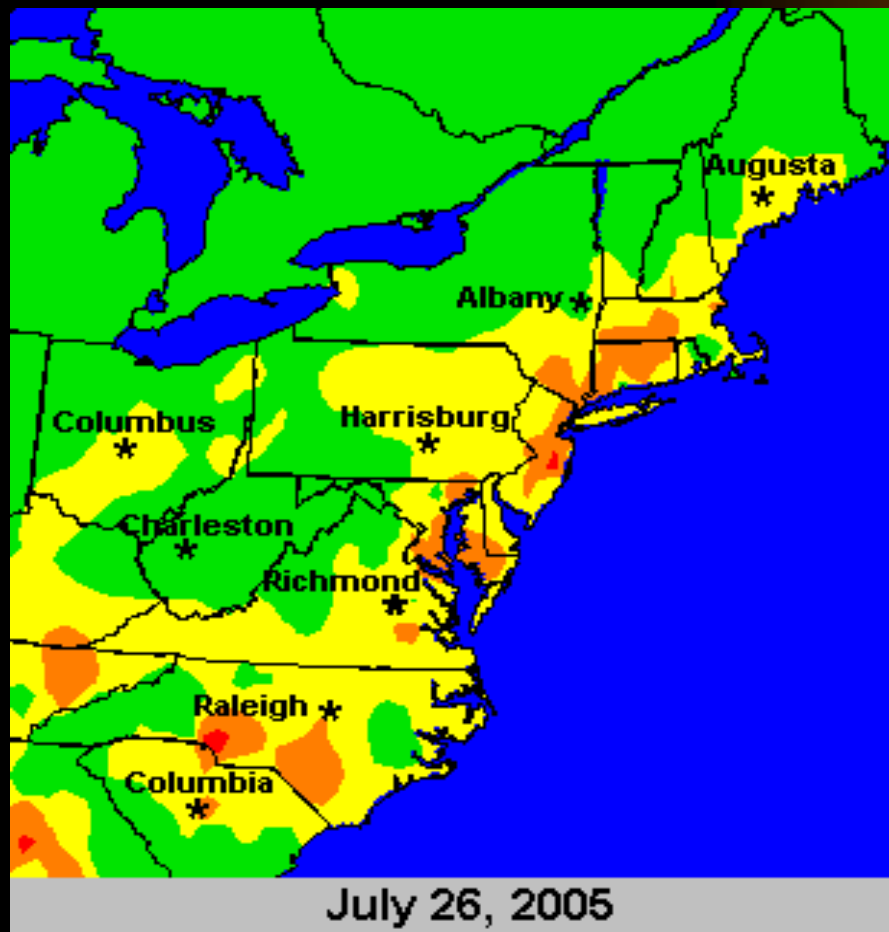
August 2002: Daily Number of HEDD Units Operating in NJ vs. Trenton Maximum Temperatures



Maximum 8-hour Ozone Concentrations



Maximum 8-hour Ozone Concentrations



How can EGU NO_x be reduced ?

- Combustion Controls
 - Burner Design
 - Water Injection
- Post-Combustion Controls: $\text{NO}_x \rightarrow \text{N}_2$
 - SNCR
 - NH_3 , Urea injection at 1,600 -2,100 °F
 - 30% -50% reduction
 - SCR
 - NH_3 injection upstream of catalyst at 350 - ~1,100 °F
 - > 90% reduction

How can EGU NO_x be reduced ?

- Switch Fuel
 - Oil \rightarrow Natural Gas
- “Environmental Dispatch”
 - Favor cleaner units in dispatch strategy
- Replace Old Units

How can EGU NO_x be reduced ?

- Ozone Transport Commission (OTC) MOU
 - Multi-year effort – March 2, 2007
 - www.otcair.org/document.asp?fview=Formal Actions#
- NJ HEDD Rule: N.J.A.C. 7:27-30
 - Proposal due in NJ Register August 4, 2008
 - Will be available at www.nj.gov/dep/aqm/curformp.htm2009
 - 2009
 - Owners/Operators of HEDD units to submit plans to reduce EGU NO_x by 19.8 tons on forecast HED days
 - 2015
 - HEDD units must meet new Performance Standards

How can EGU NO_x be reduced ?



- Implementation of:
 - An Energy Efficiency Measure
 - A Demand Response Measure
 - A Renewable Energy Measure